CALIBRATION PROTOCOL

Summary and Introduction

This protocol offers uniform guidelines for the calibration of analytical instruments used in chemical environmental analyses. The protocol is comprehensive, but may be superseded by stricter requirements in mandated test methods or regulations. The protocol contains several sections, but the principal two address initial instrument calibration and continuing instrument calibration verification.

The process for initial instrument calibration follows a logical progression that asks users to select or identify:

- A calibration model.
- The number of standards appropriate for the selected calibration model.
- The concentration of the selected standards.
- A calibration function that employs a reduction technique appropriate for the calibration model and number of standards selected.

Once a calibration function has been established, users are required to evaluate the calibration's acceptability against set criteria. As a final check, immediately after it has been established, the calibration is checked with standards from a source different from the one used to generate the calibration. The section concludes with provisions for eliminating standard responses from calibrations for single analyte or multi-analyte standards.

The protocol contains specific guidance for calibrating instruments tuned to conform to a scientific law or scale, such as pH and dissolved oxygen meters, and for calibrating inductively coupled plasma emission spectrophotometers and inductively coupled plasma mass spectrometers.

The process for continuing instrument calibration verification is followed when a full calibration is not generated on an analysis day, after analyzing a specified number of consecutive samples, and after a specified time period elapses. The protocol requires the user to select a number of verification standards that is appropriate for the calibration model selected and reduction technique chosen. The calibration is verified when the verification standards meet established acceptance criteria.

The protocol concludes with procedures to follow when the continuing calibration verification fails acceptance criteria.

This protocol was developed by the State Assessors Calibration Group. The State Assessors Calibration Group was formed by the State Assessors Forum, a volunteer group of state assessors that meet approximately bimonthly via teleconference to discuss regulatory and technical issues related to the assessment of environmental laboratories.

A preliminary draft of the protocol was distributed to the State Assessors Forum for review and comment. This version of the protocol incorporates changes resulting from comments received. The document will be revised as needed based on comments and suggestions received from its users. Although this protocol is not mandatory, the authors hope that assessors and laboratories use it widely as a resource and reference.

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